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BAUMANNELLA, A NEW PERLODINE GENUS FROM CALIFORNIA (PLECOPTERA: PERLODIDAE)[1]

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Abstract.—*Perla alameda* Needham & Claassen is removed from *Kogotus* and placed in a new monotypic genus, *Baumannella*. The new genus is distinctive in all life stages and differs markedly from known perlodine genera in having a flattened, biconcave egg. The apparent sister group of *Baumannella* is the western nearctic endemic genus, *Osobenus*.

Perla alameda Needham & Claassen has remained an enigmatic species since the original description by Needham and Claassen (1925). Ricker (1952) studied the holotype male and found the epiproct suggestive of *Kogotus*, but the unproduced paragenital plates along with poor condition of the specimen prohibited definitive placement. Jewett (1954) studied seven specimens, including two females from several California localities, and assigned the species to *Kogotus*. No additional information has appeared for the species since that time.

Recently R. W. Baumann and W. D. Shepard collected a series of specimens which were identified as *Kogotus alamedus*, but reared nymphs were found to be atypical of *Kogotus* in having bidentate rather than unidentate laciniae; these specimens were referred to us for detailed study. Our study from available material indicates this species is distinct from *Kogotus* and other perlodine genera in all life stages; consequently, we are assigning *P. alameda* to a new monotypic genus, *Baumannella*. Methods follow Stark and Stewart (1981).

Baumannella Stark and Stewart, New Genus

Type species.—*Perla alameda* Needham & Claassen.

Male genitalia.—Lateral stylets absent. Paragenital plates partially sclerotized, terminating in membranous hairy lobes. Epiproct short and slightly sclerotized, ventral margin coiled inward and covered with fine brown setae giving a sclerotized aspect (Figs. 1, 4). Hemitergal lobes broadly rounded and covered with peg-like setae (Fig. 1). Tergum 9 unmodified; sternum 7 with well developed mesal lobe (Fig. 2).

Female genitalia.—Subgenital plate broadly rounded, extending over ca. ⅔ ster-

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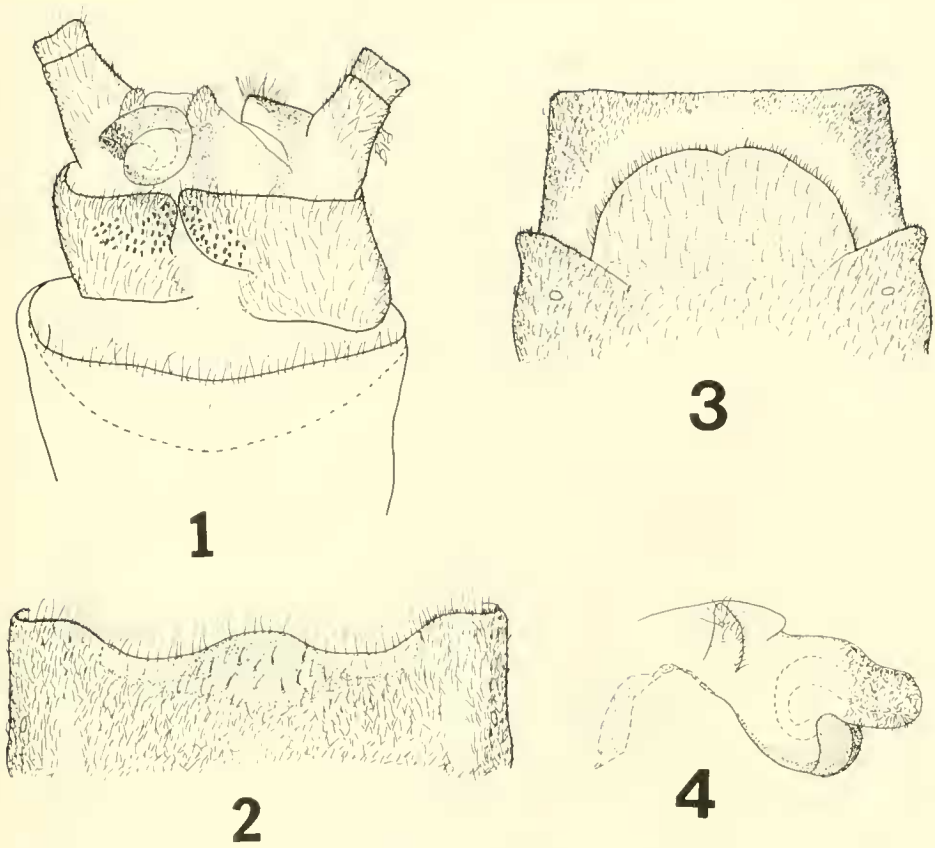


Figs. 1–4. *Baumannella alameda* genitalia. 1, Male terminalia, oblique dorsolateral aspect. 2, Male sternum 7. 3, Female sterna 8 and 9. 4, Epiproct, lateral.

num 9; typically with small apical notch. Sternum 9 with dense apical patch of short setae (Fig. 3).

Nymph.—Body yellow with brown markings; legs, antennae and cerci yellow. Head with pair quadrangular dark spots connected at anterior ocellus, forming an M-shaped anterior margin; frontoclypeal area light except pair small oval dark spots and dark marginal band; pair broken oval dark spots between eyes, and irregular reticulate dark markings on occiput; spinules around posterior half of eye and as indistinct partial occipital band not extending to midline (Fig. 6). Laciniae triangular, bidentate, with 2 or 3 stout axillary hairs and 2–4 stout hairs below base of subapical tooth; only 1 or 2 inner marginal short setae, if present, and scattered short basal setae; terminal tooth about 0.5 outer lacinial length and subapical tooth about 0.45 length of terminal tooth (Fig. 7). Mandibles somewhat flattened, not deeply cleft and with distinct serrations on inner margin of major ventral tooth (Fig. 8). Gills absent. Pronotum yellow with scattered, reticulate discal markings; fine spinules along anterior and posterior margins; hairs absent laterally; sparse median dorsal fringe fine hairs down pronotum (Fig. 6) and entire

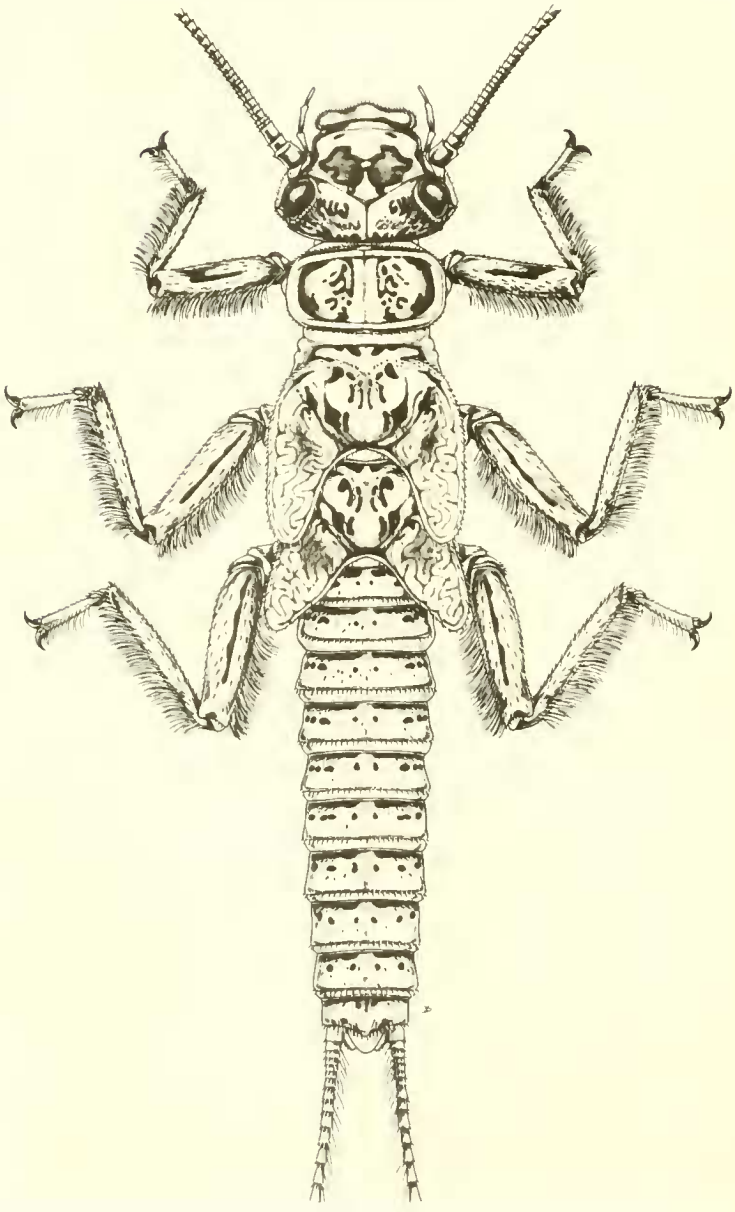
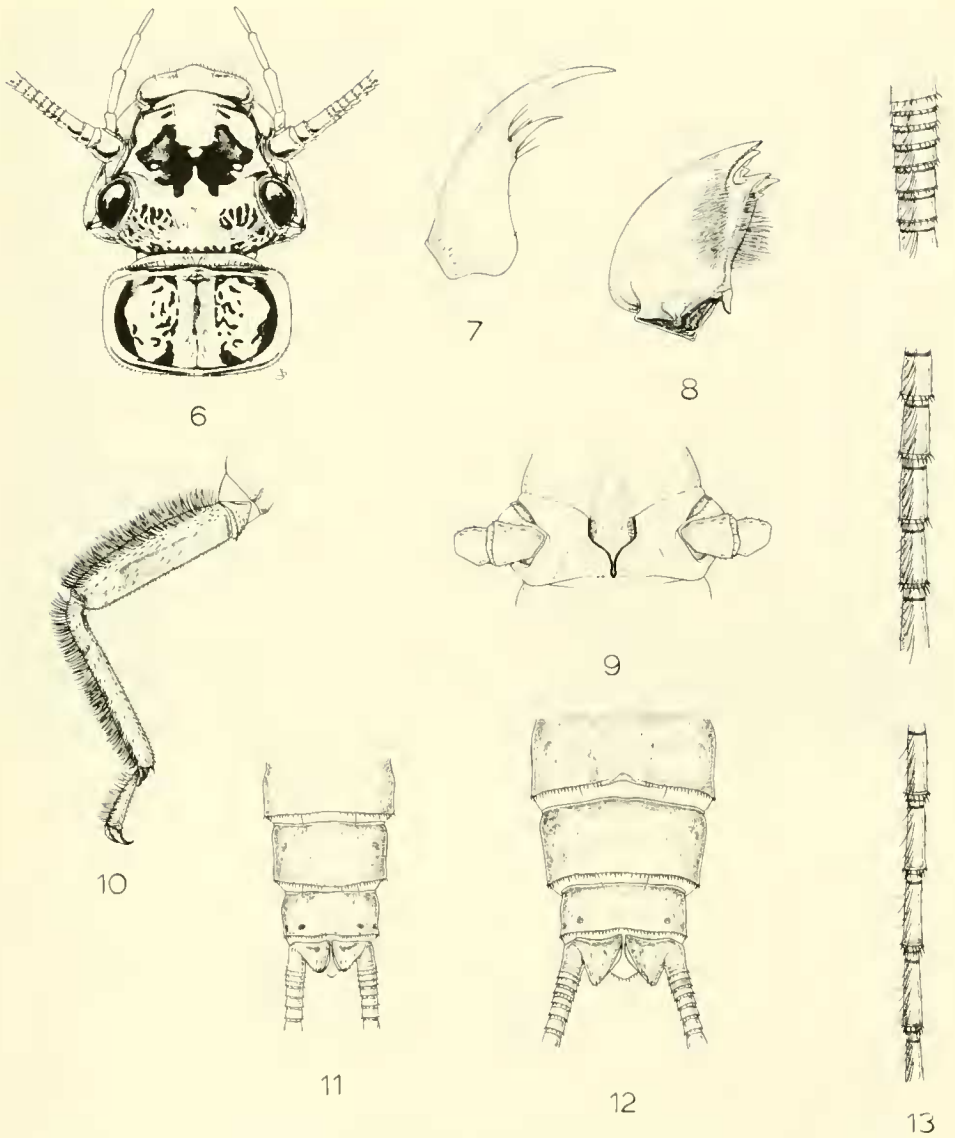


Fig. 5. *Baumannella alameda* nymphal habitus.

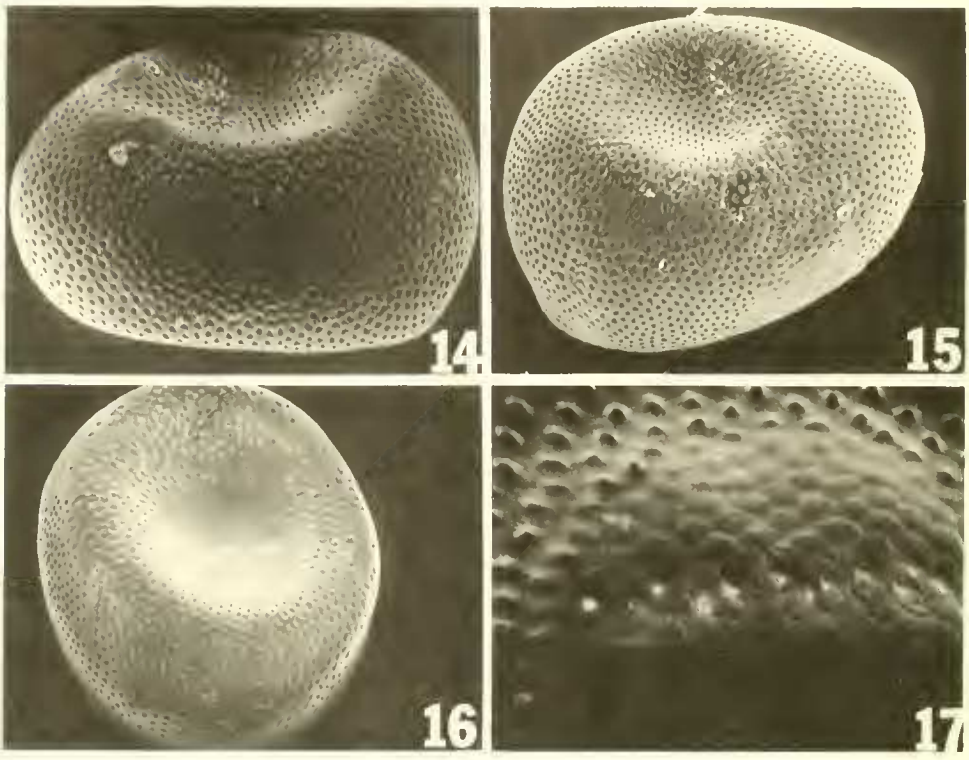
length of body. Y-arms of mesosternum meet posterior corners of furcal pits, with indistinct transverse suture (Fig. 9). Wingpads yellow, with scattered irregular brown spots (Fig. 5). Femora and tibiae with scattered dorsal surface spinules and a white, silky hair fringe (Figs. 5, 10). Abdominal tergae yellow, with incomplete anterior transverse dark band, pair of medial spots and 2–3 lateral spots; fewer than 20 intercalary spinules and with posterior fringe of hairs (Fig. 5). Male 8th



Figs. 6–13. *Baumannella alameda* nymphal structures. 6, Head and pronotum. 7, Right lacinia, ventral. 8, Right mandible, ventral. 9, Mesosternum. 10, Right foreleg, dorsal. 11, Sterna 8–10, male. 12, Sterna 8–10, female. Cerci, basal, mesal and apical (dorsal view).

and 9th sternum with mesal gap in posterior setal row (Fig. 11); female 8th sternum with mesal gap and developing subgenital plate, and 9th sternum with complete posterior setal row (Fig. 12). Cercal segments with posterior whorl of short setae and sparse dorsal fringe of silky white hairs (Fig. 13).

Egg.—Asymmetrically biconcave. Collar absent. Chorion coarsely punctate except for median ventral disc which is covered with hexagonal follicle cell impressions; irregular micropylar row of ca. 12–15 small orifices bisects ventral disc (Figs. 14–17).



Figs. 14–17. *Baumannella alameda* eggs. 14, Lateral aspect, 270×. 15, Dorsal aspect, 230×. 16, Ventral aspect, 230×. 17, Ventral aspect, 950×.

Etymology.—The generic name, *Baumannella*, honors our friend and colleague Richard W. Baumann.

Material examined.—CALIFORNIA: *Alameda Co.*, San Antonio Crk, 21-V-22, B.C. Cain, 1 ♂ (Holotype #1143, Cornell Univ.). *Napa Co.*, Pope Valley, 3-V-30, E. C. Van Dyke, 1 ♀ (Cal. Acad. Sci.). *San Benito Co.*, Pinnacles Nat. Mon., 3-V-46, H. P. Chandler, 1 ♂, 1 ♀ (Allotype #8609, Cal. Acad. Sci.). *Solano Co.*, Cold Crk., 8 mi W Winters, abv. Lk. Berryessa, 17-V-83, R. W. Baumann & W. D. Shepard, 3 ♂, 8 ♀, 18 nymphs (Monte L. Bean Museum; W. D. Shepard collection).

Diagnosis.—Male *Baumannella* will key to *Kogotus* in Ricker (1952) but are distinguished from *Kogotus* by the absence of peg-like spinules on abdominal tergum 9 and by the membranous, hairy paragenital lobes and reduced sclerotization of the paragenital plates. The coiled epiproct structure appears to have arisen independently in these genera (a parallel case exists for "whip-like" epiprocts in *Remenus*, *Isogenoides* and *Arcynopteryx*); *Osobenus* which shares both the coiled epiproct and the hairy paragenital lobe characters with *Baumannella* would appear to be a potential sister group within Diploperlini (Stark and Szczytko, 1984) but these genera are distinguished in nymph and adult by the mesosternal groove pattern noted by Ricker (1952) and most readily in the male by the upturned apical process of the *Osobenus* epiproct (Ricker 1952). *Rickera* is the apparent sister group of *Kogotus* (Szczytko and Stewart, 1984).

Females are distinguished from related western nearctic perlodids by the long, apically notched subgenital plate and by the distinctive biconcave egg which is unique among known Diploperlini. Nymphs will key to the *Pictetiella-Chernokrilus* couplet in Stewart and Stark (1984) or to *Cultus* if the short occipital and anterolateral prothoracic setae are overlooked, but *Baumannella* nymphs are readily distinguished from these genera by the conspicuous serrations present along the inner margins of the major mandibular teeth and by the distinctive color pattern of the mature nymph.

Although egg shape is atypical of other Diploperlini we are referring *Baumannella* to this group on the basis of reduced setation on the nymphal lacinia and on the basis of the produced male 7th sternal lobe.

Acknowledgments

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Literature Cited

Jewett, S. G. 1954. New stoneflies from California and Oregon (Plecoptera). Pan-Pac. Entomol. 30: 167–179.

Needham, J. G. and P. W. Claassen. 1925. A monograph of the Plecoptera or stoneflies of America North of Mexico. Thomas Say Found. Entomol. Soc. Am. 2: 1–397.

Ricker, W. E. 1952. Systematic studies in Plecoptera. Indiana Univ. Publ. Sci. Ser. 18: 1–200.

Stark, B. P. and K. W. Stewart. 1981. The nearctic genera of Peltoperlidae (Plecoptera). J. Kans. Entomol. Soc. 54: 285–311.

Stark, B. P. and S. W. Szczytko. 1984. Egg morphology and classification of Perlodinae (Plecoptera: Perlodidae). Ann. Limnol. 20: 99–104.

Stewart, K. W. and B. P. Stark. 1984. Nymphs of North American Perlodinae genera (Plecoptera: Perlodidae). Great Basin Nat. 44: 373–415.

Szczytko, S. W. and K. W. Stewart. 1984. Descriptions of *Calliperla* Banks, *Rickera* Jewett, and two new western nearctic *Isoperla* species (Plecoptera: Perlodidae). Ann. Entomol. Soc. Am. 77: 251–263.